



**PIONEER**  
Pioneer Energy Services

## MICRORESISTIVITY LOG

Company MURFIN DRILLING CO., INC.  
Well SOUCIE KRISS UNIT #1-14  
Field JIMMY NORTHEAST  
County THOMAS  
State KANSAS

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County THOMAS State KANSAS

Location: API #: 15-193-21052-00-00

2275' FSL & 2860' FEL

SEC 14 TWP 10S RGE 34W

Permanent Datum GROUND LEVEL Elevation 3209'  
Log Measured From KELLY BUSHING  
Drilling Measured From KELLY BUSHING

Other Services  
CNL/CDL  
DIL/BHCS  
Elevation  
K.B. 3217'  
D.F. N/A  
G.L. 3209'

|                        |                |  |  |
|------------------------|----------------|--|--|
| Date                   | 8/28/2019      |  |  |
| Run Number             | ONE            |  |  |
| Depth Driller          | 4895'          |  |  |
| Depth Logger           | 4895'          |  |  |
| Bottom Logged Interval | 4894'          |  |  |
| Top Log Interval       | 3750'          |  |  |
| Casing Driller         | 8.625" @ 307'  |  |  |
| Casing Logger          | 306'           |  |  |
| Bit Size               | 7.875"         |  |  |
| Type Fluid in Hole     | CHEMICAL       |  |  |
| Salinity, ppm CL       | 7000           |  |  |
| Density / Viscosity    | 9.3 84         |  |  |
| pH / Fluid Loss        | 10.0 8.8       |  |  |
| Source of Sample       | FLOWLINE       |  |  |
| Rm @ Meas. Temp        | 0.40 @ 73      |  |  |
| Rmt @ Meas. Temp       | 0.30 @ 73      |  |  |
| Rmc @ Meas. Temp       | 0.54 @ 73      |  |  |
| Source of Rmt / Rmc    | CHARTS         |  |  |
| Rm @ BHT               | 0.23 @ 125     |  |  |
| Operating Rig Time     | 5 HOURS        |  |  |
| Max Rec. Temp. F       | 125            |  |  |
| Equipment Number       | P-24           |  |  |
| Location               | HAYS           |  |  |
| Recorded By            | IAN MABB       |  |  |
| Witnessed By           | ROBERT HENDRIX |  |  |

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All interpretations are opinions based on inferences from electrical or other measurements and Pioneer Wireline Services, LLC cannot and does not guarantee the accuracy or correctness of any interpretation, and Pioneer Wireline Services, LLC will not be liable or responsible for any loss, costs, damages, or expenses incurred or sustained by anyone resulting from any interpretation made by any of our officers, agents or employees.

### Comments

N/A DENOTES NOT AVAILABLE OR NON-APPLICABLE.

COLBY, KS.

HWY 25 SOUTH TO COUNTY RD D, WEST 2 MILE,  
1/2 NORTH, WEST INTO

Log Measured From: KELLY BUSHING 8' Ft. Above Permanent Datum

THANK YOU FOR USING PIONEER ENERGY SERVICES  
www.pioneerenergy.com 785-625-3858

### Your Pioneer Energy Services Crew

Engineer: IAN MABB  
Operator:  
Operator:  
Operator:

### This Log Record Was Witnessed By

Primary Witness: ROBERT HENDRIX  
Secondary Witness:  
Secondary Witness:  
Secondary Witness:

# Log Variables

DatabaseC:\ProgramData\Warrior\Data\murfin\_soucie\_kriss\_unit\_1\_14.db  
Dataset field/well/stackmel/pass3.1/\_vars\_

## Top - Bottom

|           |             |             |             |           |            |       |              |
|-----------|-------------|-------------|-------------|-----------|------------|-------|--------------|
| A         | BOREID      | BOTTEMP     | CASEOD      | CASETHCK  | FLUIDDEN   | M     | MATRXDEN     |
| 1         | in<br>7.875 | degF<br>125 | in<br>5.5   | in<br>0   | g/cc<br>1  | 2     | g/cc<br>2.71 |
| NPORSEL   | PERFS       | SNDERR      | SNDERRM     | SPSHIFT   | SRFTEMP    | SZCOR | TDEPTH       |
| Limestone | 0           | mmho/m<br>8 | mmho/m<br>6 | mV<br>166 | degF<br>73 | Off   | ft<br>4895   |

| Sensor            | Offset (ft) | Schematic                                                                           |                                                                                     | Description                                         | Length (ft) | O.D. (in) | Weight (lb) |
|-------------------|-------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-----------------------------------------------------|-------------|-----------|-------------|
| GR                | 40.58       |    |    | GR-M&W (233-M&W)                                    | 3.00        | 3.50      | 50.00       |
| CNLSC             | 37.48       |    |    | CNT-M&W (207-MW)                                    | 5.50        | 3.50      | 100.00      |
| CNSSC             | 36.73       |    |                                                                                     |                                                     |             |           |             |
| LSD               | 28.43       |  |   | CDL-M&W (96-916)                                    | 8.50        | 4.00      | 250.00      |
| DCAL              | 28.42       |                                                                                     |                                                                                     |                                                     |             |           |             |
| SSD               | 27.93       |                                                                                     |                                                                                     |                                                     |             |           |             |
| ML-PSIML (PSI-01) |             |                                                                                     |  | GO Micro log tools converted to Simplec electronics | 7.58        | 4.00      | 65.00       |
| MCAL              | 19.83       |  |                                                                                     |                                                     |             |           |             |
| MI                | 19.83       |                                                                                     |                                                                                     |                                                     |             |           |             |
| MN                | 19.83       |                                                                                     |                                                                                     |                                                     |             |           |             |
| RLL3F             | 15.80       |  |  |                                                     |             |           |             |
| RLL3              | 15.80       |                                                                                     |                                                                                     |                                                     |             |           |             |
| CILD              | 8.00        |  |  | DIL-PSI HIGH TEMP (1039)                            | 18.50       | 3.50      | 220.00      |

CILM

4.70

SP

0.20

Dataset: murfin\_soucie\_kriss\_unit\_1\_14.db: field/well/stackmel/pass3.1  
 Total length: 43.08 ft  
 Total weight: 685.00 lb  
 O.D.: 4.00 in

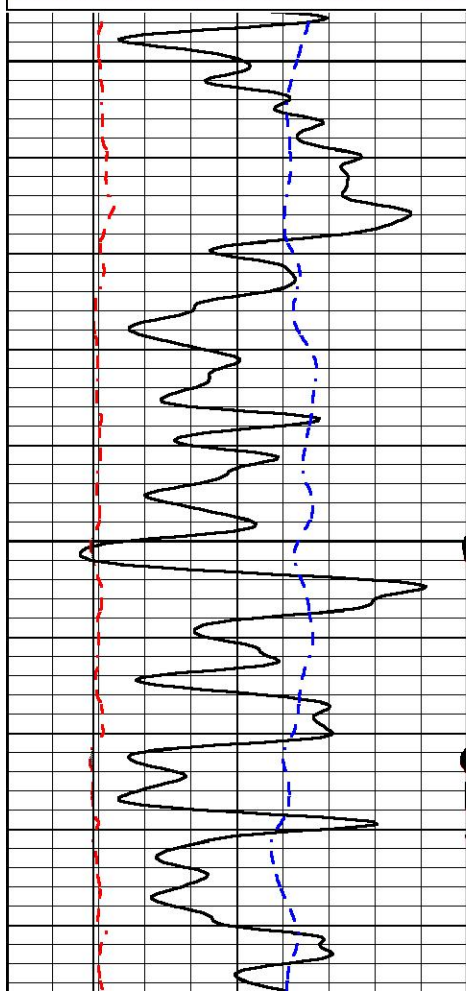


# MAIN PASS

Database File murfin\_soucie\_kriss\_unit\_1\_14.db  
 Dataset Pathname stackmel/pass3.1  
 Presentation Format \_micro  
 Dataset Creation Wed Aug 28 14:57:32 2019  
 Charted by Depth in Feet scaled 1:240

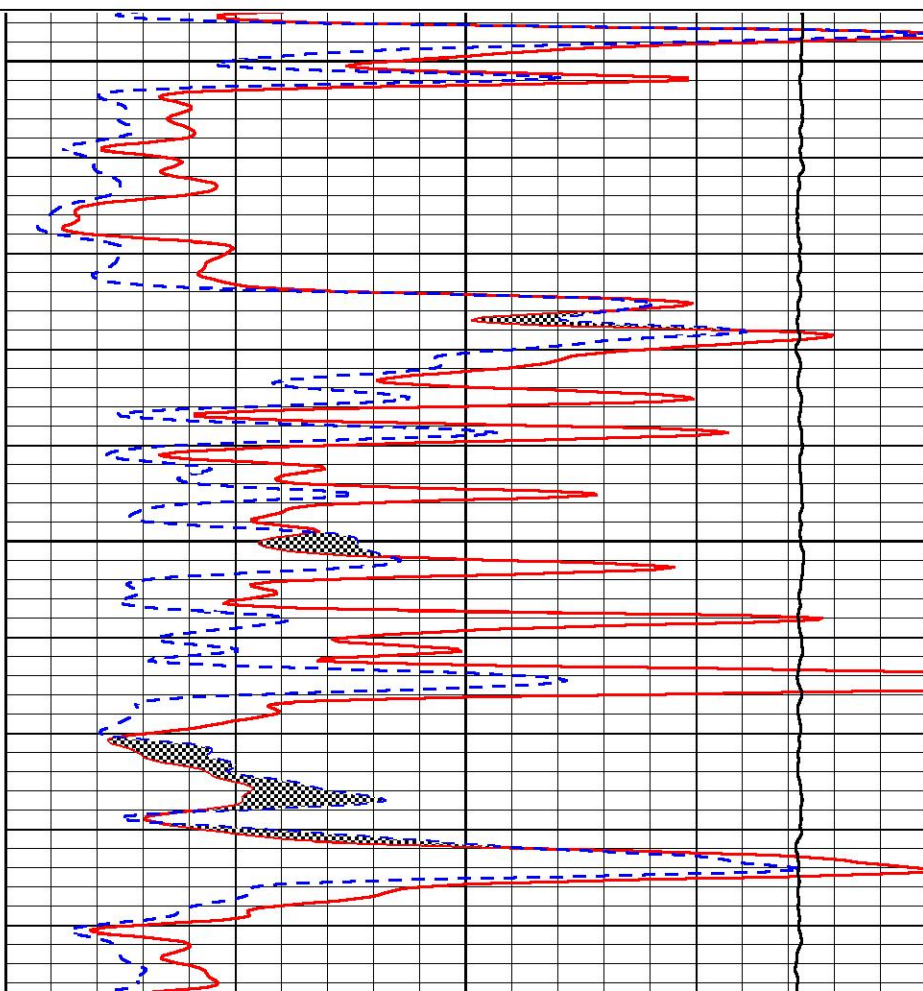
|       |                  |       |
|-------|------------------|-------|
| 0     | GAMMA RAY (GAPI) | 150   |
| 6     | MCAL (in)        | 16    |
| 2.875 | mcad (in)        | 7.875 |
| 6     | Bit Size (in)    | 16    |
| -200  | SP (mV)          | 0     |

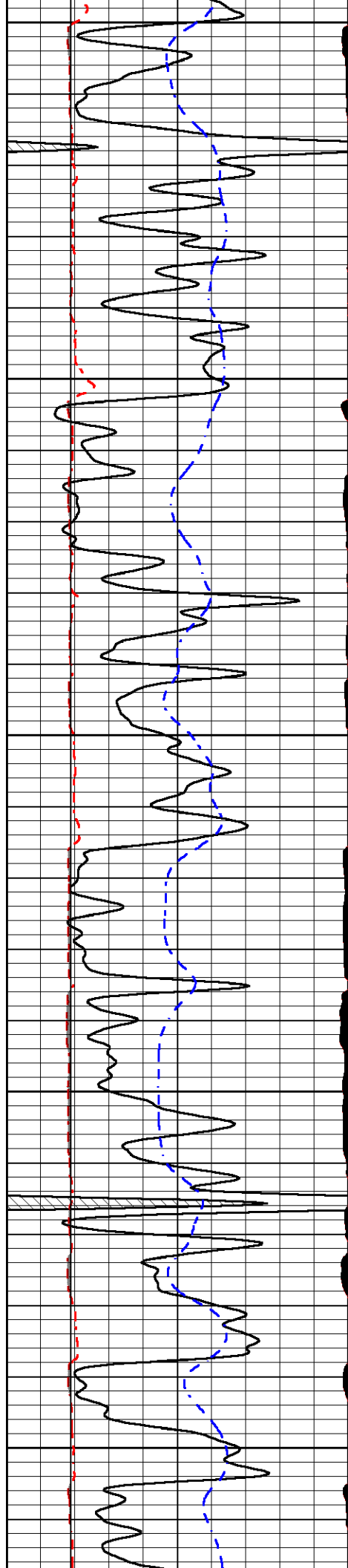
|       |                             |    |
|-------|-----------------------------|----|
| 0     | MICRO INVERSE 1 X 1 (Ohm-m) | 40 |
| 0     | MICRO NORMAL 2" (Ohm-m)     | 40 |
| 10000 | Line Weight (lb)            | 0  |



3750

3800





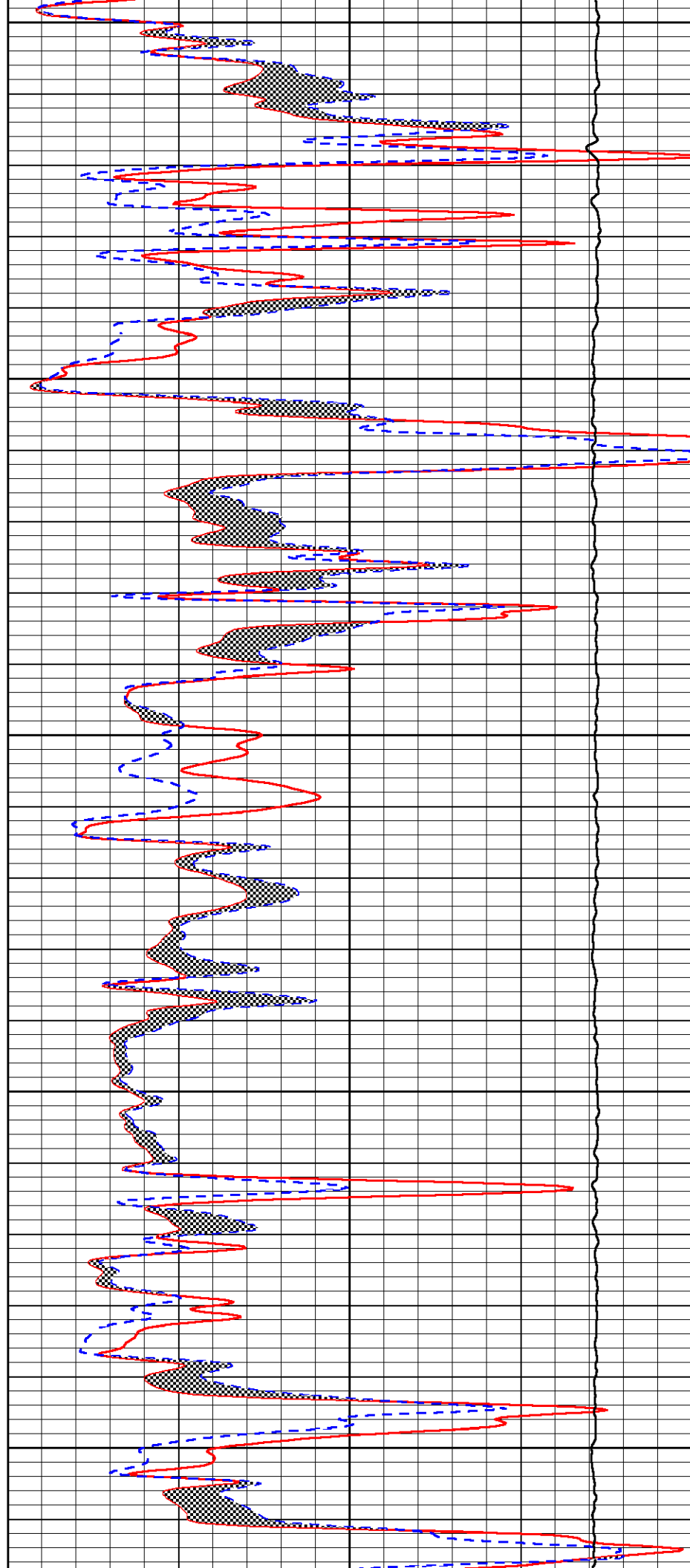
3850

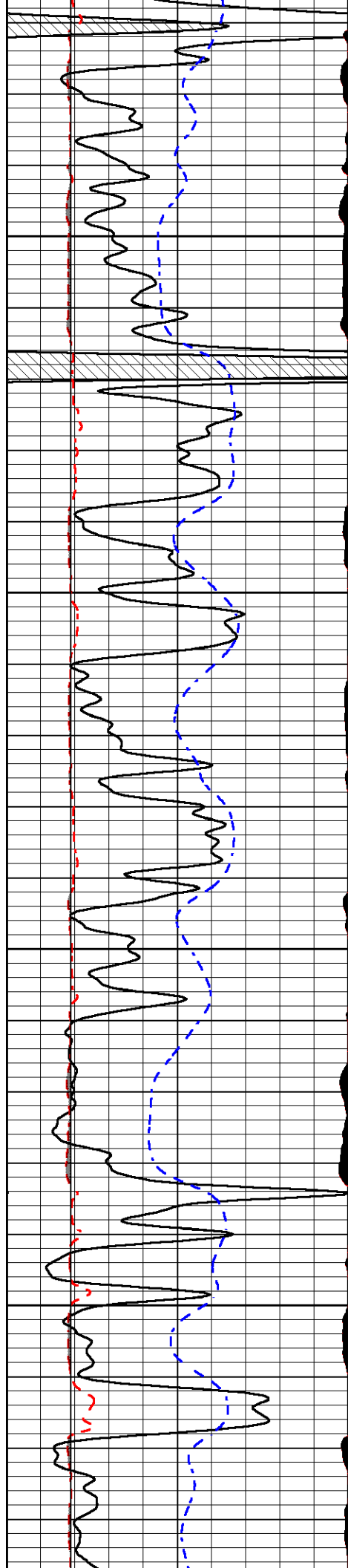
3900

3950

4000

4050



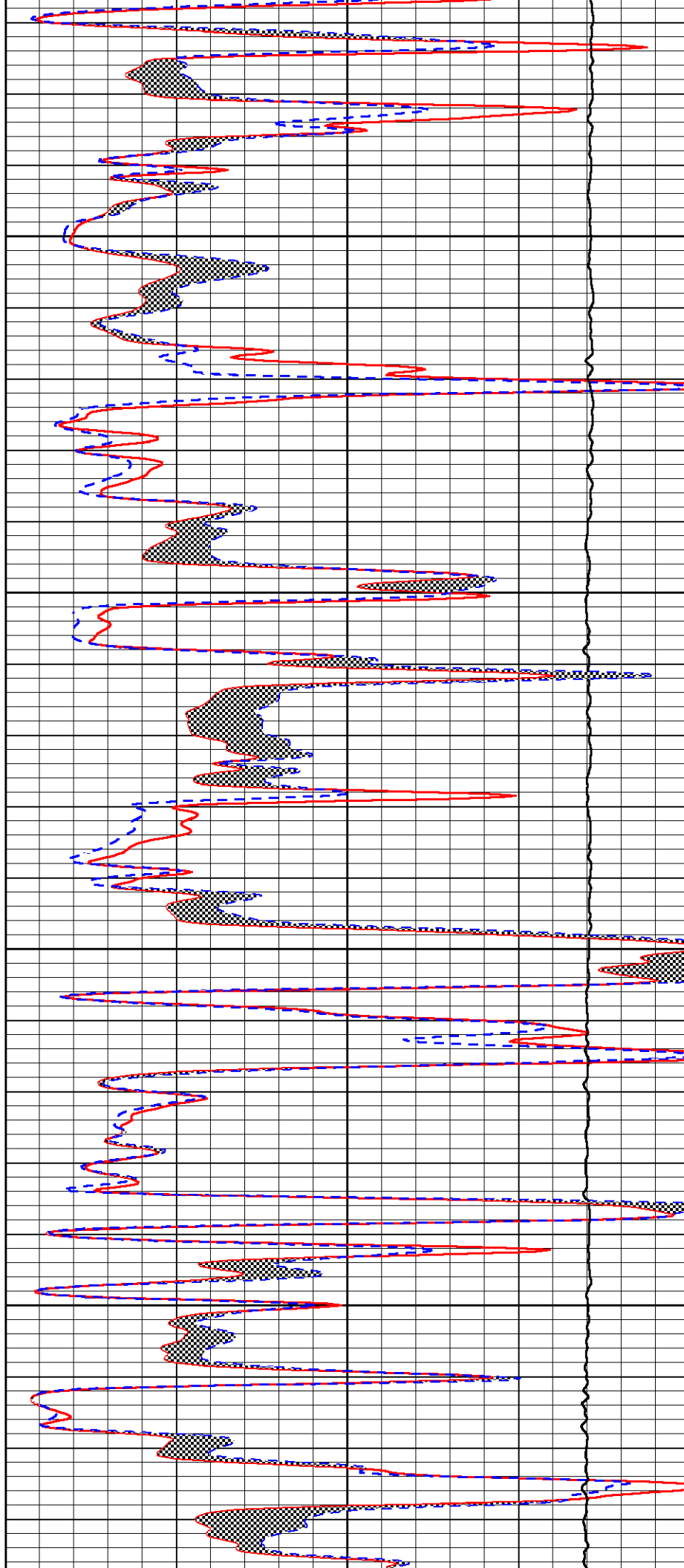


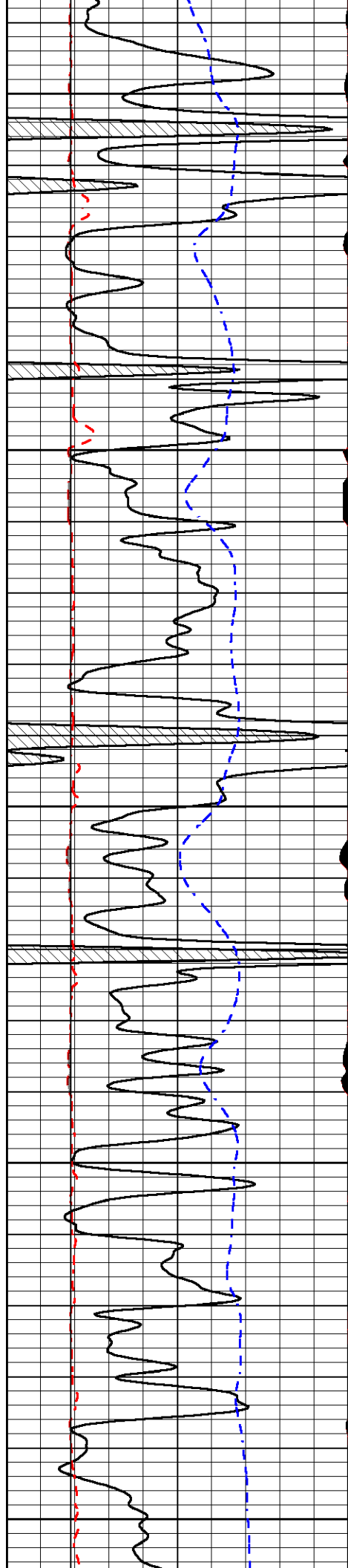
4100

4150

4200

4250





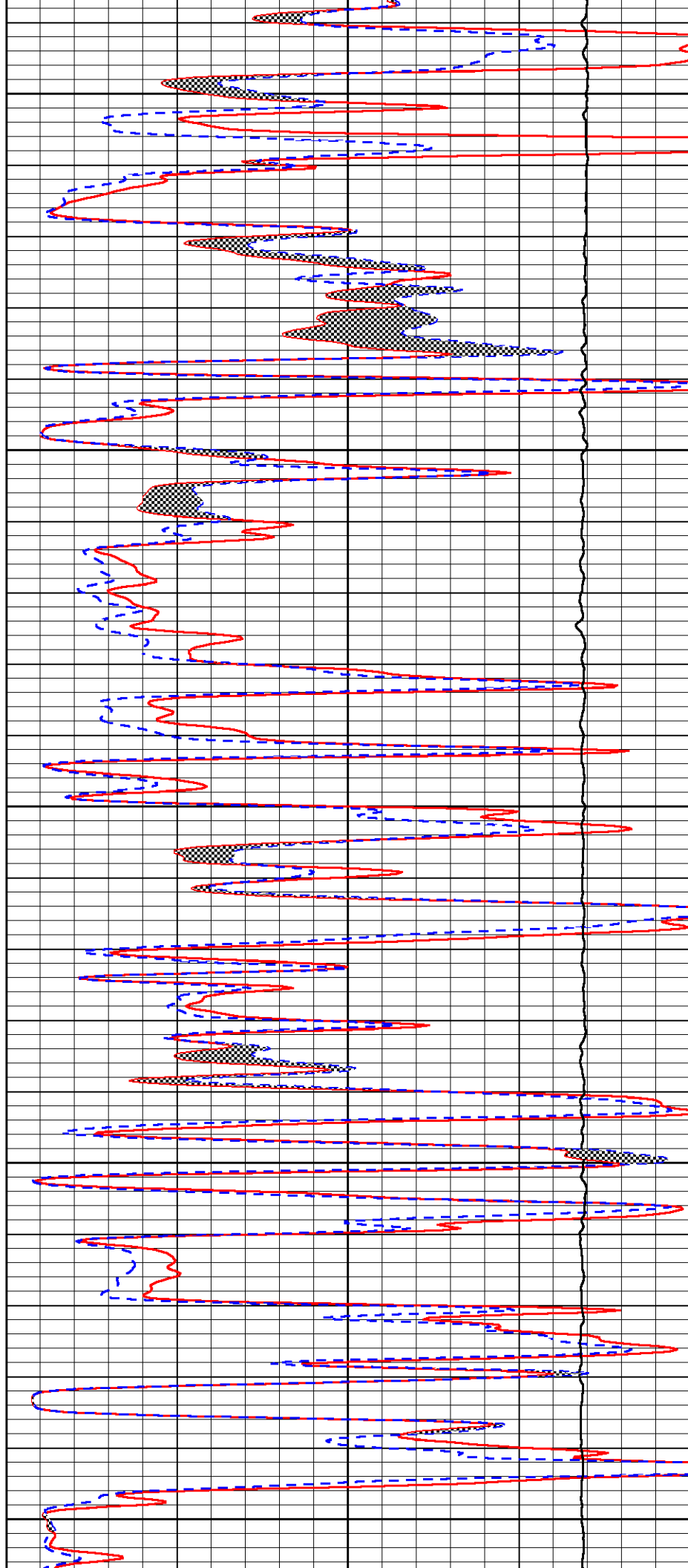
4300

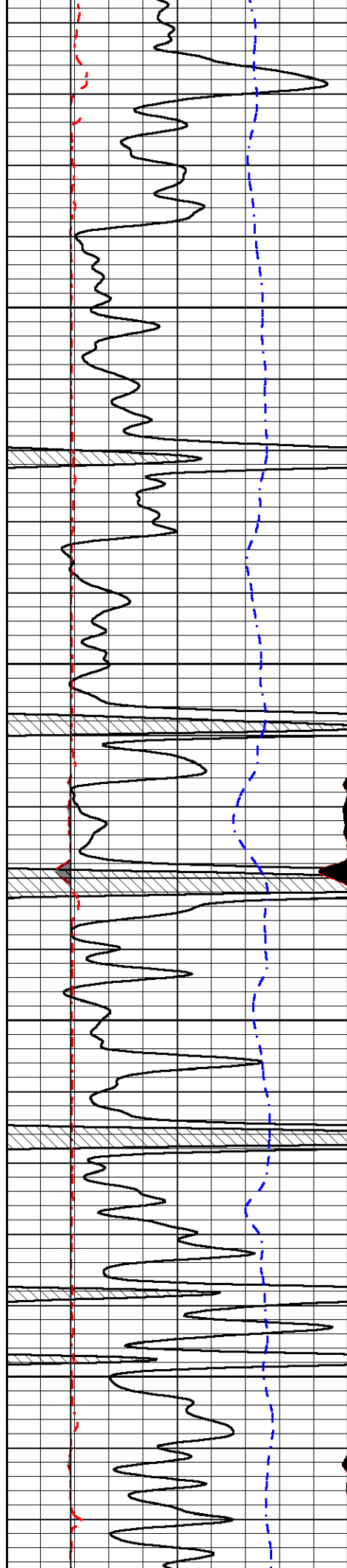
4350

4400

4450

4500



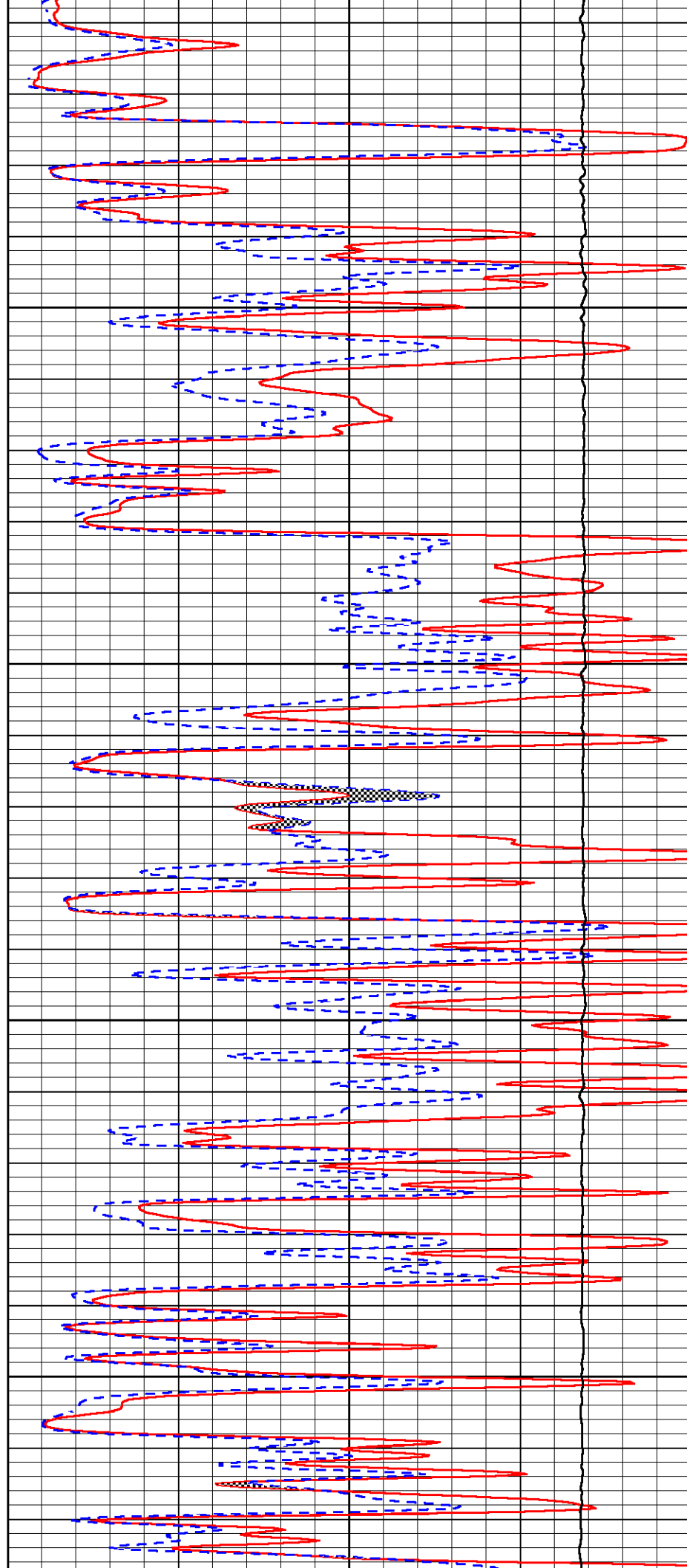


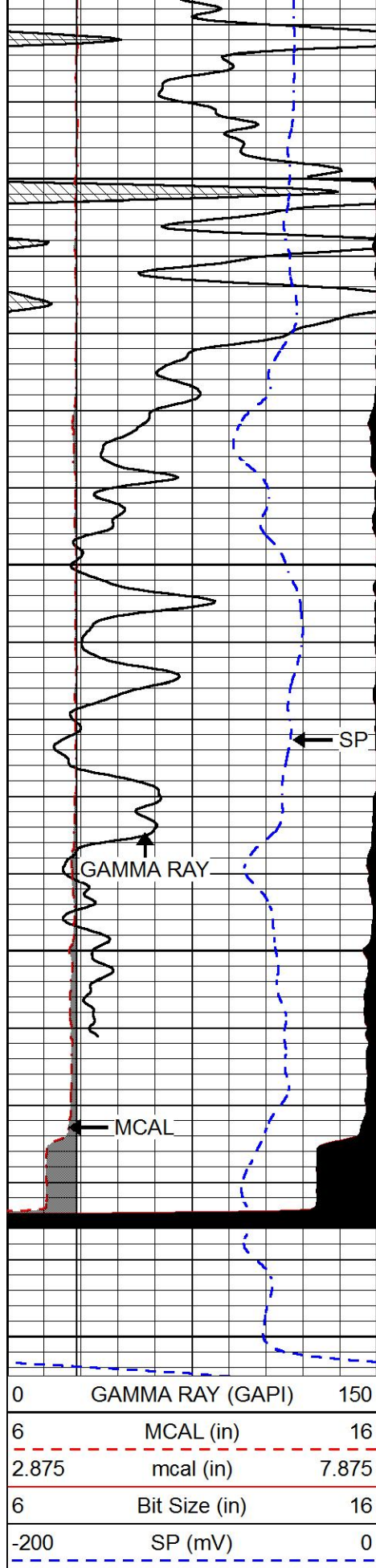
4550

4600

4650

4700





4750

mcal

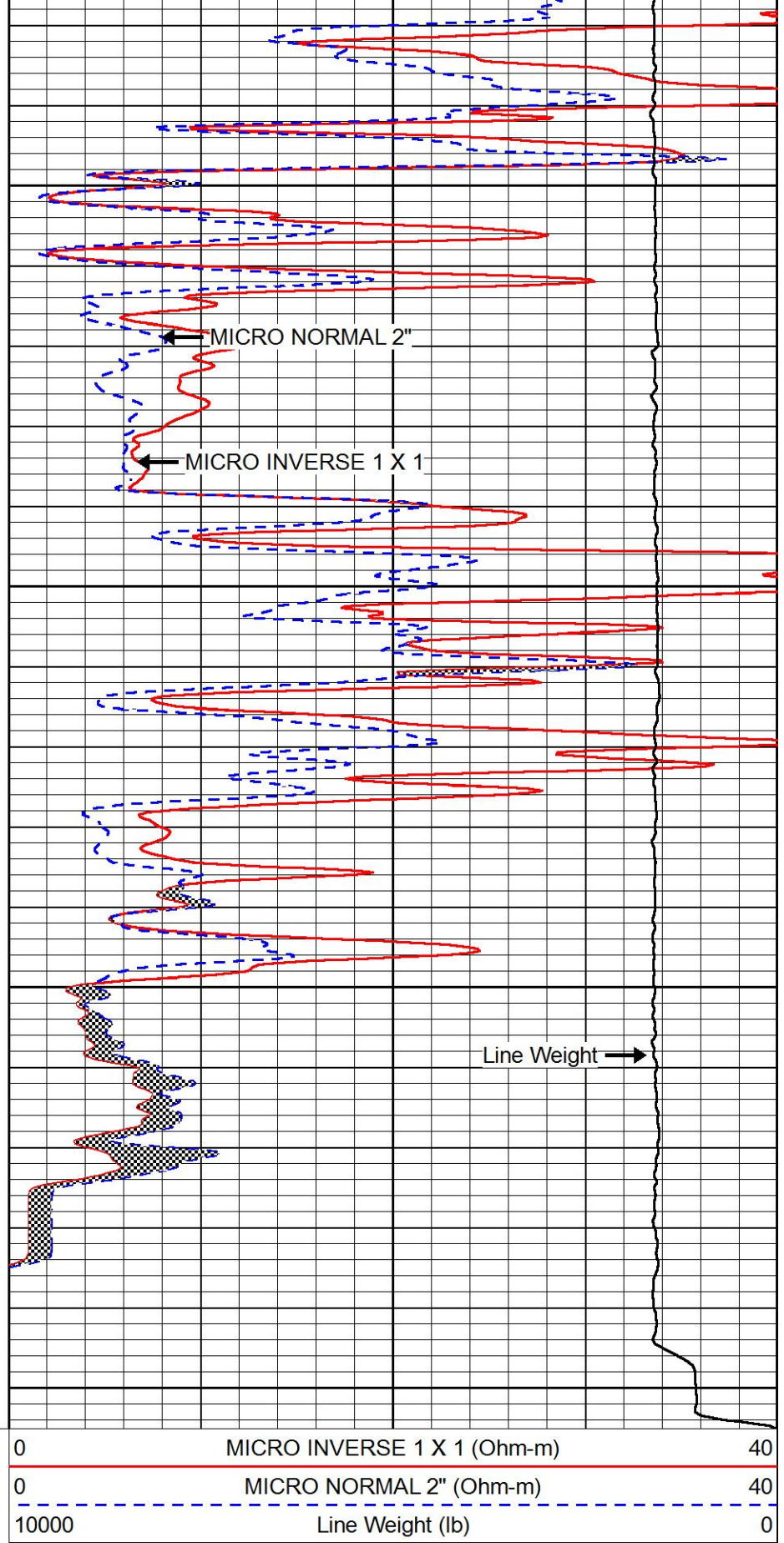
SP

GAMMA RAY

MCAL

4850

4900



MICRO NORMAL 2"

MICRO INVERSE 1 X 1

Line Weight

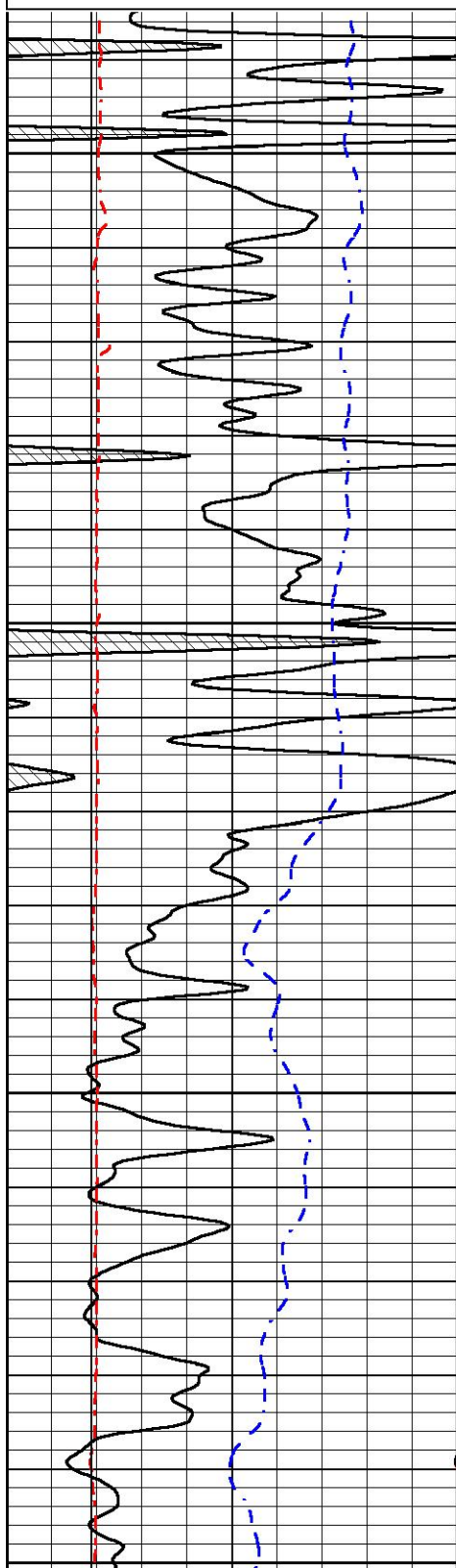


REPEAT SECTION

Database File murfin\_soucie\_kriss\_unit\_1\_14.db  
 Dataset Pathname stackmel/pass2.1  
 Presentation Format \_micro  
 Dataset Creation Wed Aug 28 13:24:16 2019  
 Charted by Depth in Feet scaled 1:240

|       |                  |       |
|-------|------------------|-------|
| 0     | GAMMA RAY (GAPI) | 150   |
| 6     | MCAL (in)        | 16    |
| 2.875 | mcals (in)       | 7.875 |
| 6     | Bit Size (in)    | 16    |
| -200  | SP (mV)          | 0     |

|       |                             |    |
|-------|-----------------------------|----|
| 0     | MICRO INVERSE 1 X 1 (Ohm-m) | 40 |
| 0     | MICRO NORMAL 2" (Ohm-m)     | 40 |
| 10000 | Line Weight (lb)            | 0  |

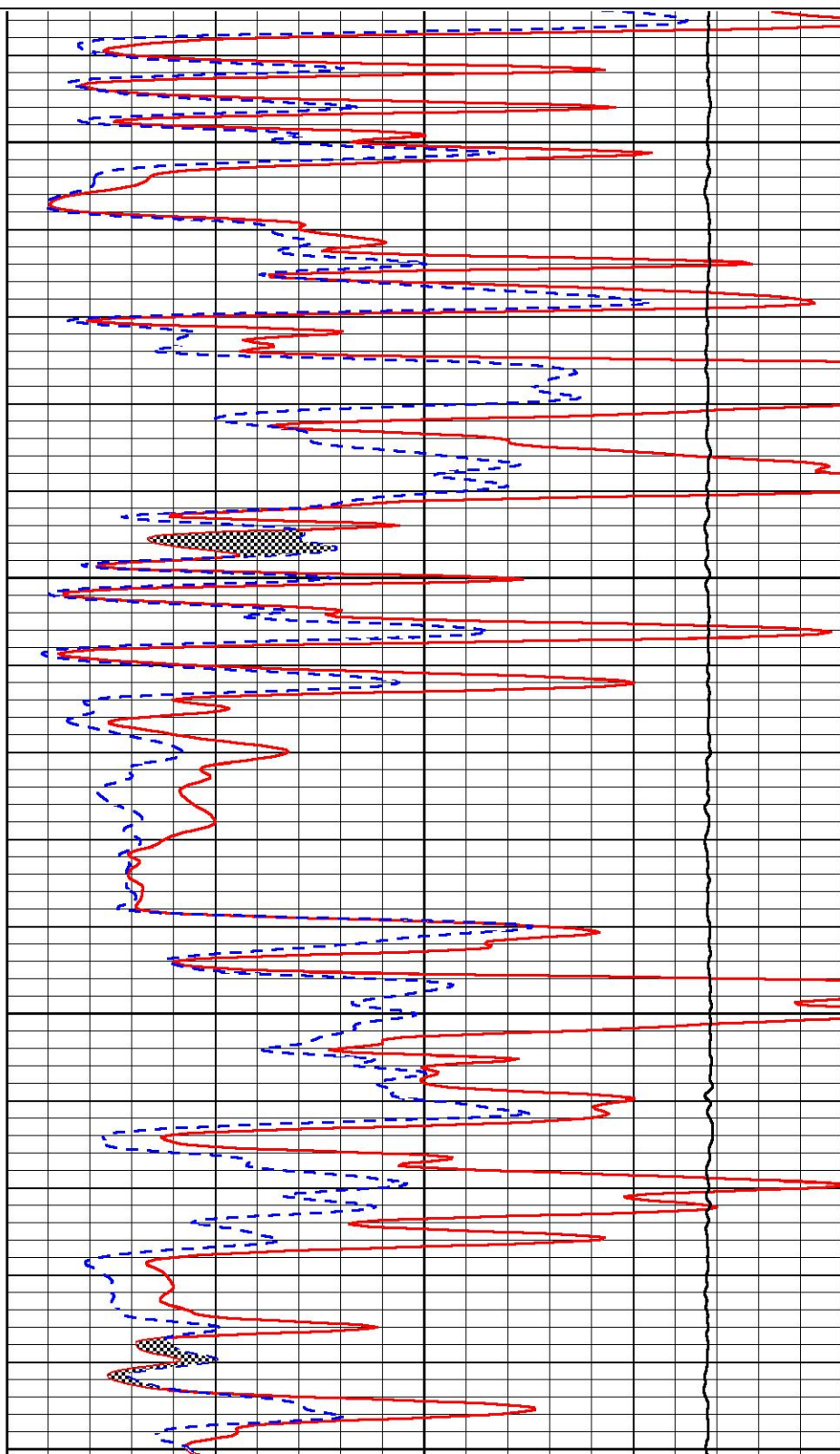


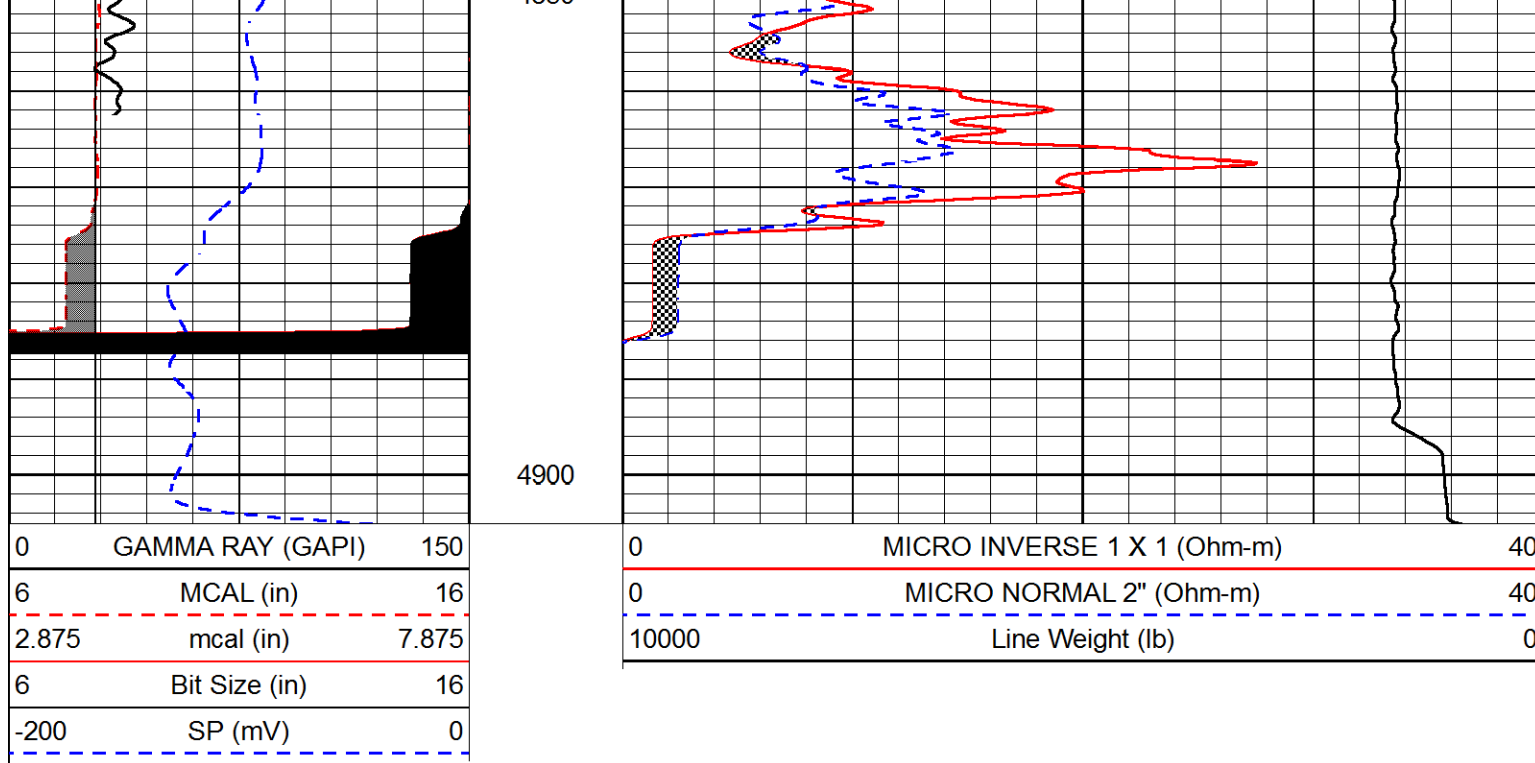
4700

4750

4800

4850





| Calibration Report |                                  |  |
|--------------------|----------------------------------|--|
| Database File      | murfin_soucie_kriss_unit_1_14.db |  |
| Dataset Pathname   | stackmel/pass3.1                 |  |
| Dataset Creation   | Wed Aug 28 14:57:32 2019         |  |

| Dual Induction Calibration Report |                          |  |
|-----------------------------------|--------------------------|--|
| Serial-Model:                     | 1039-PSI HIGH TEMP       |  |
| Calibration Performed:            | Tue Jul 09 07:46:05 2019 |  |

| Loop:  | Readings |          | References |         |        | Results |         |
|--------|----------|----------|------------|---------|--------|---------|---------|
|        | Air      | Loop     | Air        | Loop    |        | Gain    | Offset  |
| Deep   | 167.000  | 835.000  | 0.000      | 255.800 | mmho/m | 0.430   | -51.000 |
| Medium | 0.000    | 1348.000 | 142.000    | 255.800 | mmho/m | 0.365   | -49.000 |

| Microlog Calibration Report |                          |  |
|-----------------------------|--------------------------|--|
| Serial-Model:               | PSI-01-PSIML             |  |
| Performed:                  | Thu Aug 01 07:57:13 2019 |  |

|         | Readings |        | References |         |       | Results    |          |
|---------|----------|--------|------------|---------|-------|------------|----------|
|         | Zero     | Cal    | Zero       | Cal     |       | m          | b        |
| Normal  | 0.0000   | 1.0000 | 0.0000     | 1.0000  | Ohm-m | 17000.0000 | -0.7000  |
| Inverse | 0.0000   | 1.0000 | 0.0000     | 1.0000  | Ohm-m | 18000.0000 | -0.6000  |
| Caliper | 1.0001   | 1.1397 | 6.5000     | 18.5000 | in    | 70.0000    | -64.1500 |

| Compensated Density Calibration Report |                          |  |
|----------------------------------------|--------------------------|--|
| Serial-Model:                          | 96-916-M&W               |  |
| Source / Verifier:                     | 16955B / 2ci             |  |
| Master Calibration Performed:          | Wed Mar 27 11:00:53 2019 |  |

| Master Calibration |  |  |
|--------------------|--|--|
|--------------------|--|--|

|                     | Density |      | Far Detector                | Near Detector |     |
|---------------------|---------|------|-----------------------------|---------------|-----|
| Magnesium           | 1.755   | g/cc | 8943.64                     | 10054.60      | cps |
| Aluminum            | 2.655   | g/cc | 1595.61                     | 6242.82       | cps |
| Spine Angle = 74.54 |         |      | Density/Spine Ratio = 0.503 |               |     |
|                     | Size    |      | Reading                     |               |     |
| Small Ring          | 8.00    | in   | 1.75                        |               |     |
| Large Ring          | 29.00   | in   | 1.38                        |               |     |

## Compensated Neutron Calibration Report

Serial Number: 207-MW  
Tool Model: M&W  
Calibration Performed: WED FEB 13 10:30:30 2019

| Detector    | Readings |     | Target      | Normalization |  |
|-------------|----------|-----|-------------|---------------|--|
| Short Space | 6240.00  | cps | 1000.00 cps | 1.6025        |  |
| Long Space  | 460.00   | cps | 1000.00 cps | 1.9500        |  |

## Gamma Ray Calibration Report

Serial Number: 233-M&W  
Tool Model: M&W  
Calibration Performed: Fri Feb 07 01:42:40 2014

Calibrator Value: 1.0 GAPI

Background Reading: 0.0 cps  
Calibrator Reading: 1.0 cps

Sensitivity: 0.5500 GAPI/cps



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